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Contributions to the Mesozoic flora of the Atlantic coastal plain—IV. Maryland *

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(WITH PLATE 8)

The present contribution is devoted to a brief description of some recent additions to the flora of the Magothy formation in the state of Maryland. The Magothy formation, arenaceous in this region and more or less argillaceous to the northeastward, has been found to contain an abundant flora. From beds of this age in New Jersey the writer has recorded 114 different species of fossil plants. In 1906 a brief contribution made known 41 species of fossil plants from beds of this age in Delaware and Maryland. The exact localities were Deep Cut on the C. & D. Canal just east of the Maryland state line with 32 species; Grove Point in Cecil County, Md., with 25 species; and Good Hope Hill near Washington in the District of Columbia, with one species. During the last three years descriptions of three additional species have been published, bringing the known flora in the Maryland area up to 44 species. The present contribution, which is to be regarded as preliminary in character, brings the total Magothy flora of Maryland up to 71 species and makes known several new localities. Many additional localities, as yet unexploited, will largely increase these figures. The present localities are Grove Point on the eastern shore of Chesapeake Bay in Cecil County at the extreme top of the formation; Round Bay and Little Round Bay on the Severn River in Anne Arundel County, also near the top of the formation; Brightseat in Prince George's County; and Good Hope Hill and Pennsylvania Avenue extended in the District of Columbia across the Anacostia River from Washington.

Synonymy is entirely omitted.

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FILICALES

GLEICHENIA DELAWARENSIS Berry, Johns Hopkins Univ.

Circ. II. 7 : 82. *f. 3, 3a.* 1907

This species, which was described recently from the Magothy formation at Deep Cut in Delaware, is also present at Grove Point, Md.

PINALES

BRACHYPHYLLUM MACROCARPUM Newb. Fl. Amboy Clays 51
(footnote). 1896

This wide-spread Upper Cretaceous conifer has already been recorded from Deep Cut, Delaware, so that it is not surprising that it should be collected at Grove Point, particularly as it has been recently collected by the writer to the southward in the Carolinas.

SEQUOIA REICHENBACHI (Gein.) Heer, Fl. Foss. Arct. 1 : 83.
1868

This very wide-ranging Mesozoic species occurs toward the top of the Magothy formation at Round Bay and at Little Round Bay on the Severn River. Both the foliage and three specimens of the characteristic cones were recently collected at Grove Point.

SEQUOIA AMBIGUA Heer, Fl. Foss. Arct. 3¹ : 78. 1874

This characteristic species, while mainly a Lower Cretaceous form, ranges upward into the Atane beds of Greenland, the Magothy of Gay Head, and the Tuscaloosa of Alabama. The present record is based upon leafy twigs from Round Bay on the Severn River.

Moriconia americana sp. nov.

Moriconia cyclotoxon Deb. & Ettings. ; Berry, Bull. N. Y. Bot. Gard. 3 : 65. *pl. 43. f. 4 ; pl. 48. f. 1-4.* 1903 ; Bull. Torrey Club 31 : 70. 1904 ; 33 : 165-167. 1906.

The conviction that the post-Raritan material of the Atlantic coastal plain referred to *Moriconia cyclotoxon* Deb. & Ettings. is specifically distinct from that species has grown with the increase in our knowledge. In 1903 the writer, in describing the material from Cliffwood Bluff, N. J., pointed out that it was uniformly one hundred per cent. more robust than in the European or earlier

American specimens. Similar large-sized forms have been discovered by the writer in the Magothy formation at Deep Cut, Delaware; Grove Point, Maryland; from the homotaxial Black Creek formation in North Carolina; and the Middendorf formation of South Carolina. The latter formation in particular contains an abundant representation of this species. It may be distinguished primarily by its invariably larger size, the relatively much shorter distichous twigs, and the universal presence in the material collected of leaves along the axis of the larger twigs. A new locality for Maryland is at Round Bay on the Severn River.

WIDDRINGTONITES REICHHI (Ettings.) Heer, Fl. Foss. Arct. 6²: 51.
pl. 28. f. 5. 1882

This wide-spread conifer, previously recorded from the Maryland area at Deep Cut, Grove Point, and Overlook Inn, is present at Round Bay on the Severn River.

ARECALES

FLABELLARIA MAGOTHIENSIS Berry, Torrey 5: 32. *f. 1, 2.* 1905

These fragmentary leaves of a Cretaceous fan-palm are present in the collections from Round Bay on the Severn River. The species has been previously recorded from the Magothy formation at Grove Point, Maryland; Deep Cut, Delaware; and pits of the Cliffwood Brick Company, New Jersey.

SALICALES

SALIX LESQUEREUXII Berry, Bull. Torrey Club 36: 252. 1909

This well-known and wide-spread Upper Cretaceous form is contained in the collections from the Pennsylvania Avenue locality.

FAGALES

QUERCUS MORRISONIANA Lesq. Cret. & Tert. Fl. 40. *pl. 17. f. 1, 2.* 1883

This Cretaceous laurel oak was described by Lesquereux from the Dakota Group in Colorado. It has been recorded also from the Magothy formation at Cliffwood Bluff, N. J., and from Center Island, N. Y. The present material comes from Round Bay.

Quercus severnensis sp. nov.

Leaves of small size, ovate-lanceolate in outline, becoming gradually narrowed apically, 7 cm. in length by 2.3 cm. in greatest breadth, which is in the basal half of the leaf. Apex pointed. Base rounded. Petiole short and stout. Margin entire for its basal fourth, above which it is beset with distant, prominent, serrate teeth separated by inequilateral rounded sinuses. Midrib stout. Secondaries remote, 6–8 pairs, subopposite to alternate, branching from the midrib at angles of from 45° to 50° , but slightly curved, not prominent; basal ones sending branches into the teeth, distal ones running direct to the marginal teeth. (PLATE 8, FIGURE 3.)

This species is somewhat suggestive of the much older *Quercophyllum chinkapinensis* Ward of the Patapsco formation and it is closely related to *Quercus Holmesii* Lesq., of the Dakota Group of the West and the Magothy formation of New Jersey. Among modern oaks analogies may be found among the scrub and live oaks of the Pacific slope, as, for example, *Quercus Wislizeni*, *Quercus agrifolia*, *Quercus tomentella*, and *Quercus chrysolepis*, especially the first; and with *Quercus Ilex* of Europe. The single specimen comes from Round Bay on the Severn River.

RANALES

SASSAFRAS ACUTILOBUM Lesq. Cret. Fl. 79. *pl.* 14. *f.* 12. 1874

This common Cenomanian species is abundantly represented in the Magothy formation of Maryland. The present material is from Grove Point, Cecil County; Brightseat, Prince George's County; and the Pennsylvania Avenue locality in the District of Columbia.

SASSAFRAS CRETACEUM Newb. Later Ext. Fl. 14. 1868

This Dakota Group species is represented in the Magothy formation of Maryland by specimens from Brightseat, Prince George's County; and Overlook Inn Road and Pennsylvania Avenue extended in the District of Columbia. It is of especial interest as a form reported by Stanton* in association with *Inoceramus labiatus* in the Woodbury formation of Iowa.

* Stanton, Bull. U. S. Geol. Surv. 106: 21. 1893.

MAGNOLIA OBTUSATA Heer, Fl. Foss. Arct. 6² : 90. *pl.* 15. *f.* 12; *pl.* 21. *f.* 3. 1882

This species is confined to the Atane beds of Greenland, the Dakota Group of the West, and the Magothy formation of the Atlantic coastal plain. The present record is based on material from Grove Point, Cecil County.

MAGNOLIA LACOEANA Lesq. Fl. Dakota Group 201.
pl. 60. *f.* 1. 1892

This is a Dakota Group species which reappears in both the Raritan and Magothy formations of the coastal plain. The present material comes from Grove Point in Cecil County.

MAGNOLIA LONGIPES Hollick, Bull. Torrey Club 21 : 60.
pl. 178. *f.* 3. 1894

Specimens of the basal half of the leaves of this species, showing the characteristic outline, venation, and long stout petioles are present at Grove Point.

MAGNOLIA BOULAYANA Lesq. Fl. Dakota Group 202.
pl. 60. *f.* 2. 1892

This common Upper Cretaceous species is present at Grove Point, the most southern locality at which it has been recognized in the East. Recent collections from Alabama show this species to have been a member of the Tuscaloosa flora. In the West it extends southward to Texas (Woodbine formation).

NELUMBO PRIMAeva Berry, Bull. N. Y. Bot. Gard. 3 : 75.
pl. 43. *f.* 1. 1903

This small species heretofore known from a single specimen found at Cliffwood Bluff in New Jersey occurs in the Upper Magothy at Round Bay on the Severn River.

ROSALES

PLATANUS HEERII Lesq. Ann. Rep. U. S. Geol. & Geog.
Surv. Terr. 1871 : 303. 1872

This species, which was described originally from the Dakota Group of Kansas, was recorded by Heer from the Atane beds of

Greenland and by Dawson from the Mill Creek series of Canada. Lesquereux * reported it from Pettit's bank, South River, N. J. (Raritan), but it has never been found in the abundant Raritan materials examined by the late Professor Newberry or the writer and it is probably not a member of the Raritan flora. Fragmentary leaves of this species are common in the Magothy formation at the Pennsylvania Avenue locality.

COLUTEA PRIMORDIALIS Heer, Fl. Foss. Arct. 6²: 99.

pl. 27. *f.* 7-11; *pl.* 43. *f.* 7, 8. 1882

Characteristic leaves of this species occur at Grove Point, Cecil County.

LEGUMINOSITES CORONILLOIDES Heer, Fl. Foss. Arct. 3²: 119.

pl. 34. *f.* 14. 1874

This Upper Cretaceous species, which is recorded from the Dakota Group of Kansas, the Atane beds of Greenland and the Raritan and Magothy formations of the Atlantic coastal plain, is present at Grove Point in Cecil County.

LEGUMINOSITES OMPHALOBIOIDES Lesq. Fl. Dakota Group

149. *pl.* 38. *f.* 4. 1892

This species, previously recorded from the Dakota Group of Kansas and the Raritan formation of New Jersey, is present in the Magothy formation at Grove Point.

SAPINDALES

***Elaeodendron marylandicum* sp. nov.**

Leaf orbicular in general outline, 6.5 cm. to 8.5 cm. in length by 4.7 cm. to 6.2 cm. in greatest width, which is about midway between the apex and the base. Apex evenly rounded, somewhat emarginate in one specimen. Base cuneate, slightly decurrent. Margin entire below, furnished above with a few irregularly spaced and very small spine-like teeth. Petiole extremely stout, 3 cm. long in one of the smaller specimens. Midrib also stout, thinning rapidly toward the tip. Secondaries 5 or 6 pairs, alternate, campodrome, branching from the midrib at an angle of about 50° to 55° and curving slightly upward to join lateral branches from the

* Cook, Report on the clay deposits of Woodbridge, South Amboy, and other places in New Jersey 29. 1878.

secondaries next above. From the outer side of these successive arches short tertiaries run to the marginal teeth in those parts of the leaf in which the teeth are developed. (PLATE 8, FIGURE 1.)

This very handsome and well-marked species is represented by a number of specimens from Grove Point. It finds its nearest relative in certain of the larger and more orbicular variants of the Upper Raritan and Magothy species, *Celastrorphyllum Newberryanum* Hollick; in fact, it would seem reasonable to suppose that the present species, which has thus far been found only at the extreme top of the Magothy formation at Grove Point, may be descended from *Celastrorphyllum Newberryanum*, which characterizes particularly the Upper Raritan at South Amboy, New Jersey. The writer was long undecided whether or not to refer the new species to *Celastrorphyllum* or *Elaeodendron* and it may also seem preferable eventually to transfer *C. Newberryanum* to the latter genus, with which it shows many characters in common. The present species may be compared with *Elaeodendron dioicum* Griseb., from the West Indies. The genus *Elaeodendron* has mainly a Tertiary history, although Hollick has described a Magothy species recently from Gay Head (*Elaeodendron strictum*).*

RHAMNALES

Cissites formosus magothiensis var. nov.

While *Cissites formosus* as identified by Heer, Lesquereux, and Newberry is a form of considerable variability, the Magothy variety, which comes from Grove Point, is sufficiently distinct to deserve at least a varietal name. It lacks the long bifurcated lateral lobes of the type and has an elongated terminal lobe, the whole less sublobate than in the type material.

RHAMNITES APICULATUS Lesq. Fl. Dakota Group 171.

pl. 37. f. 8-13. 1892

This Dakota Group species is present in the collections from Round Bay on the Severn River.

* Hollick, Mon. U. S. Geol. Surv. 50 : 89. pl. 33. f. 6. 1907.

MYRTALES

EUCALYPTUS GEINITZI (Heer) Heer, Fl. Foss. Arct. 6² :

93. *pl. 19. f. 1c, et seq.* 1882

This wide-spread species and the variety described by Newberry as *Eucalyptus angustifolia* are both contained in the collections from Round Bay and Little Round Bay on the Severn River, and from Grove Point in Cecil County.

EUCALYPTUS LATIFOLIA Hollick, Mon. U. S. Geol. Surv.

50 : 97. *pl. 36. f. 1-5.* 1907

This large leaf, described by Hollick from Gay Head, Marthas Vineyard, and Glen Cove, Long Island, as a species of *Eucalyptus*, is contained in the collections from Round Bay on the Severn River.

THYMELEALES

LAURUS HOLLICKII Berry, Bull. N. Y. Bot. Gard.

3 : 79. *pl. 52. f. 4.* 1903

This species, which is already recorded from Grove Point, is present also in the collections from Round Bay on the Severn River.

LAURUS PROTEAEFOLIA Lesq. Bull. U. S. Geol. & Geog.

Surv. Terr. 1 : 393. 1876

This Dakota Group species, which was previously recorded from the Magothy formation in New Jersey, is present in Maryland at Grove Point and at Round Bay on the Severn River.

LAURUS PLUTONIA Heer, Fl. Foss. Arct. 6² : 75.

pl. 19. f. 1d, 2-4, etc. 1882

This Upper Cretaceous laurel, which was previously known from Grove Point, Maryland, occurs also at Round Bay on the Severn River.

LAUROPHYLLUM ELEGANS Hollick, Mon. U. S. Geol.

Surv. 50 : 81. *pl. 27. f. 1-5.* 1907

Remains of this species, described originally from the morainic material at Tottenville, Staten Island, and Glen Cove, Long Island, are present at Grove Point and common at Round Bay on the Severn River.

CINNAMOMUM INTERMEDIUM Newb. Fl. Amboy Clays

89. *pl.* 29. *f.* 1-8, 10. 1896

Previously recorded from the Magothy formation in New Jersey, Delaware, and Maryland, this species occurs at Round Bay and at Little Round Bay on the Severn River.

UMBELLALES

CORNUS FORCHHAMMERI Heer, Fl. Foss. Arct. 6²:85. *pl.* 44. *f.* 13. 1882

The Grove Point leaf upon which this record is based is a trifle narrower than the type, otherwise the two are identical. *Cornophyllum vetustum* Newb., from the New Jersey Raritan, is possibly the same species. The features in which the Maryland leaf differs from that of Newberry are its more lanceolate form; the symmetrical base; the fewer secondaries, which form a much more acute angle with the midrib and are more regular in their course; the presence of the transverse tertiaries, which are invisible in the Raritan leaf; the more regular margin, the longer petiole, stouter midrib, and coarser secondary system. All of these characters are features in which the Raritan leaf departs from the typical leaves of *Cornus*. The present species is closely allied to *Cornus praecox* Lesq., of the Dakota Group.

ARALIA RAVNIANA Heer, Fl. Foss. Arct. 6²: 84. *pl.* 38.*f.* 1, 2. 1882

This remarkable species of *Aralia*, described originally from the Atane beds of Greenland by Heer, was recorded by the writer from the Magothy formation at Cliffwood Bluff, N. J., where it is represented by a number of imperfect but characteristic leaves. It has also been recorded by Hollick from Gay Head, Marthas Vineyard, and from Tottenville, Staten Island, but these latter occurrences are based upon material of a very doubtful character.

The present record is based upon unequivocal material from Grove Point. The species is closely allied to *Aralia Towneri* Lesq. of the Dakota group.

***Aralia washingtoniana* sp. nov.**

Leaves of medium size, broadly trilobate, about 8-10 cm. in length by 8 cm. in greatest width. Sinuses shallow and rounded. Lobes broadly rounded. Petiole and midrib stout. Lateral

primaries scarcely to be distinguished from the secondaries. Secondaries 4 or 5 subopposite pairs, rather straight, indifferently camptodrome or craspedodrome. Tertiaries well marked, transverse. Margins entire. (PLATE 8, FIGURE 4.)

The remains of this species are numerous but fragmentary. In general outlines and venation they suggest a species of *Aspidiophyllum* but they lack the characteristic base of that genus. There is some resemblance, not close however, to *Aralia rotundiloba* Newb., and to *Aralia nassauensis* Hollick.

Collected at the Pennsylvania Avenue locality in the District of Columbia.

***Hedera cecilensis* sp. nov.**

Leaves of medium size, orbicular in general outline with a tendency toward trilobation, 6–7 cm. in length by about 6 cm. in greatest width. Margin entire, with shallow undulate lobes. Petiole and midrib stout. Lateral primaries suprabasilar, not differentiated from the secondaries in some specimens. Secondaries one pair below the lateral primaries and one or two remote pairs above, forking dichotomously and craspedodrome in habit. (PLATE 8, FIGURE 2.)

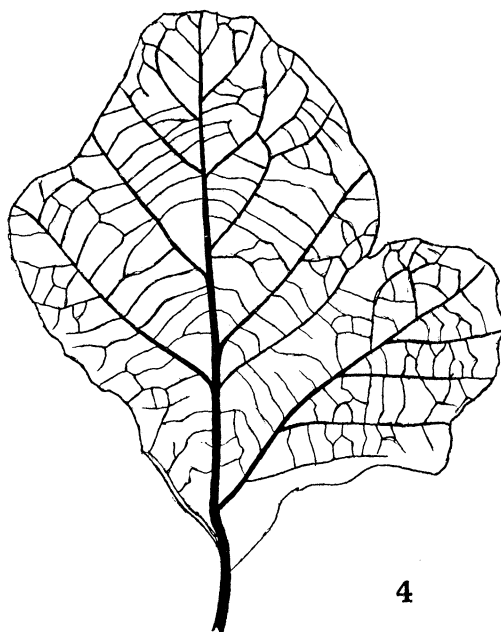
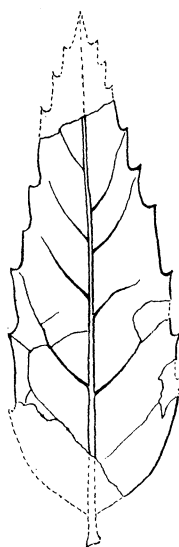
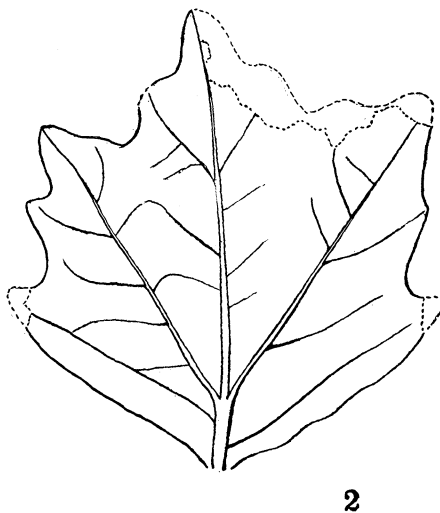
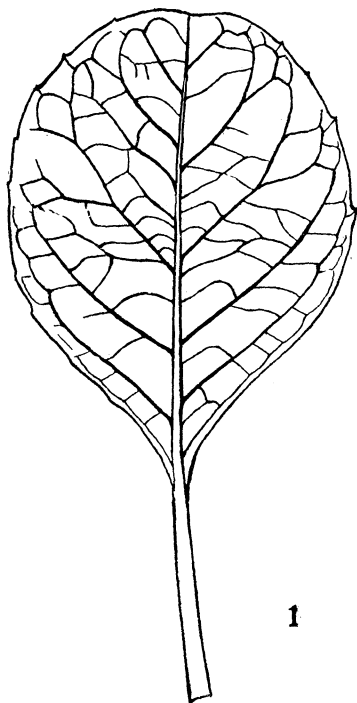
This species resembles in a general way several which Lesquereux referred to *Cissites*, as for example *Cissites Harkerianus* and *Cissites acuminatus*. In appearance it suggests the somewhat larger Dakota Group leaf which Lesquereux christened *Platanus cissoides*. It is closely related to *Hedera cretacea* Lesq., differing in the suprabasilar primaries and in the details of the general outline. *Hedera cecilensis* is a very well marked species and is evidently allied to *Hedera*, clearly differentiated however from any of the previously described forms. The genus is rather prominent in Upper Cretaceous floras, both in Europe and America, the present species and *Hedera cretacea* Lesq. resembling closely the existing species. The present material is from Upper Magothy at Grove Point in Cecil County, from which it takes its name.

ERICALES

ANDROMEDA GRANDIFOLIA Berry, Bull. Torrey Club 34 :

204. 1907

This species, previously recorded from Long Island, New Jersey, North Carolina, and Alabama, is present in the collections from Grove Point.



1. *ELAEODENDRON MARYLANDICUM* BERRY
2. *HEDERA CECILENSIS* BERRY
3. *QUERCUS SEVERNENSIS* BERRY
4. *ARALIA WASHINGTONIANA* BERRY.

ANDROMEDA NOVAE-CAESAREAE Hollick in Newb. Fl. Amboy
Clays 121. *pl.* 42. *f.* 9-12, 28-31. 1896

This characteristic Magothy form, previously recorded from Grove Point in Maryland, is also present at Round Bay on the Severn River.

ANDROMEDA COOKII Berry, Bull. Torrey Club 36: 261. 1909

Recent collections show this species to be present at both Grove Point and at Round Bay on the Severn River.

ANDROMEDA PARLATORII Heer, Phyll. Crét. d. Nebr. 18.
pl. 1. *f.* 5. 1866

Previously recorded from Deep Cut and Grove Point in the Maryland region, this widespread Upper Cretaceous species is present at Round Bay on the Severn River.

PRIMULALES

MYRSINE BOREALIS Heer, Fl. Foss. Arct. 3²: 113.
pl. 32. *f.* 23. 1874

Typical material of this common Cenomanian species is contained in the collections from Grove Point.

Explanation of plate 8

FIG. 1. *Elaeodendron marylandicum* Berry. Grove Point, Md.

FIG. 2. *Hedera cecilensis* Berry. Grove Point, Md.

FIG. 3. *Quercus severnensis* Berry. Round Bay, Md.

FIG. 4. *Aralia washingtoniana* Berry. Pennsylvania Ave., D. C.

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